

**SKILLS FRAMEWORK FOR MARINE AND OFFSHORE
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE DOCUMENT**

TSC Category	Marine and Offshore System Design					
TSC	Communication and Navigation System Design					
TSC Description	Design navigation and communication systems in compliance with international regulations					
TSC Proficiency Description	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
				MAR-MSD-4003-1.1	MAR-MSD-5003-1.1	
				Develop navigation and communication system specification sheets and sketches based on requirements of ships, rigs and/or conversions	Guide the formulation of cargo system specification sheets and sketches and approve handling equipment lists, position lists and calculations that are in line with international regulations and the equipment manufacturers' recommendations	
Knowledge				<ul style="list-style-type: none"> Operating principles of radars, gyroscopes, echo-sounders and other components of on-board navigation systems Operating principles of very high frequency (VHF) radios, satellite phones and other on-board communications systems Principles of structural and arrangement drawings and electrical drawings Types of data required for safe navigation Processes of integrating manoeuvring systems with communication and navigation equipment Basic bridge and engine room operations to design equipment layouts 	<ul style="list-style-type: none"> The International Convention for the Safety of Life at Sea (SOLAS) Chapter IV and Chapter V and other legislative requirements governing basic requirements for navigation and communication installations Procedures for formulating communication and navigation systems Methods of evaluating suitability of proposed navigation equipment Methods of evaluating suitability of proposed communication equipment In-depth information of bridge and engine room procedures to evaluate performance of navigation systems 	

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				<ul style="list-style-type: none"> • Types of power sources for communication and navigation equipment • Procedures for interfacing bridge equipment • Sensors, cameras and other process parameter measuring devices • Safety and emergency devices relevant to communication and navigation systems 	<ul style="list-style-type: none"> • In-depth information of satellite communications to ascertain applicability of proposed communication equipment 	
Abilities				<ul style="list-style-type: none"> • Study ship, rig and/or conversion specifications to ascertain navigation equipment capacities • Ascertain communication equipment requirements by evaluating trading routes and legislative requirements • Integrate communication and navigation systems • Incorporate safeties against malfunctions of communication and navigation equipment • Select appropriate interfacing software to enhance navigational capabilities • Design layout plans for communication and navigation equipment • Calculate the operating range for all equipment and tabulate results for reference • Draft communication and navigation system design drawings to be used by the 	<ul style="list-style-type: none"> • Design process workflows to execute communication and navigation system designs • Evaluate performance specification analysis on selection of sensors and actuators • Evaluate performance specification analysis on selection of navigation equipment • Evaluate performance specification analysis on selection of communication equipment • Evaluate performance specification analysis on interfacing of navigation and communication equipment • Ensure continuity of communications • Ensure incorporation of standby systems into navigation and communication systems • Evaluate final reports on selected components 	

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				manufacturing department	used to meet the system requirements	
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